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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,667	11/25/2003	Bosco P. Ho	7593-CO1	5949

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Patent Licensing Department
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EXAMINER	
FERNANDEZ, SUSAN EMILY	
ART UNIT	**PAPER NUMBER**
1651	

DATE MAILED: 02/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/721,667	HO ET AL.	
	Examiner	Art Unit	
	Susan E. Fernandez	1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 October 2005 and 28 November 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

The amendment filed November 28, 2005, has been received and entered. The text of those sections of Title 35, U.S. Code, not included in this action can be found in a prior office action.

Claims 1-17 are pending and examined on the merits.

Claim Rejections - 35 USC § 103

Claims 1-17 are rejected under 35 U.S.C. 103(a) as being obvious over Chattoraj et al. (US Pat. 6,329,165) in view of Ridgway et al. (Water Treatment Membrane Processes, McGraw Hill, 1996, pages 6.1-6.62).

Chattoraj et al. discloses a method for monitoring planktonic and sessile microbiological populations (i.e. biofouling) in an industrial water system. Chattoraj et al. teaches the same method steps as claimed in the present application, using the same fluorogenic agents (see claims 1-15; column 2, lines 30-67; column 3, lines 1-54; column 4, lines 7-34; column 5, lines 6-31, 63-64; column 6, lines 42-45; and column 7, lines 64-67 of Chattoraj et al.). In regards to the amount of fluorogenic agent used, Chattoraj discloses that "an effective amount of fluorogenic dye is between about 0.005 ppm and about 1.0 ppm, preferably between about 0.02 ppm and about 0.5 ppm, most preferably between about 0.04 ppm and about 0.1 ppm, and the most highly preferable amount of fluorogenic dye is 0.05 ppm" (column 5, lines 41-46). These ranges clearly fall within the ranges as claimed in claims 8-10 of the instant application.

Chattoraj et al. does not expressly disclose that: 1) the method is usable on a reverse osmosis membrane separation system such as those claimed in the instant application, and 2)

biocontrol agents or biocontrol methods can be used to control biofouling (Chattoraj et al. only teach the use of oxidizing and non-oxidizing biocides).

However, Ridgway et al. teaches that membrane separation processes such as reverse osmosis play essential roles in modern water treatment practice (page 6.1, lines 1-3). Additionally, membrane biofouling is a widespread problem in these treatment processes, especially in feedwater and industrial processes such as ground-water treatment, seawater desalination, and water production (i.e. in industrial water systems). See section 6.5 "Occurrence of membrane biofouling" on pages 6.20-6.21. Additionally, applicant has disclosed that membrane separation methods such as reverse osmosis are used in industrial processing of liquid streams, such as in water purification (page 1, lines 6-7 of the instant specification). Ridgway et al. also teaches that various options are available to control biofouling. Examples include the use of biocides, biocontrol agents (such as chelating agents, surfactants, and chaotropic agents), and biocontrol methods (such as ultrasound, electric fields, and air backwashes). See Table 6.4 on page 6.43.

Therefore, since reverse osmosis is commonly used in industrial water systems, as taught by Ridgway et al., it would have been obvious to use the method of Chattoraj et al. and apply it to reverse osmosis membrane separation systems. Although Chattoraj et al. only discloses the use of biocides as a means to control biofouling, it would have been obvious to modify that aspect of the method to include the use of other biocontrol agents and methods since these other venues are also known and practiced in the art, as disclosed by Ridgway et al.

Applicant's arguments filed October 19, 2005 have been fully considered but they are not persuasive. It is respectfully noted that the claims 1-17, and not claims 1-14 and 16-20 as stated

in the response filed October 19, 2005, had been rejected as being obvious over Chattoraj et al. in view of Ridgway et al. Applicant asserts that the cited references do not teach or suggest the use of fluorometers to detect fluorescence in the feed stream, first stream, and second stream. As indicated above, it would have been obvious to have modified the Chattoraj invention by including a reverse osmosis membrane separation system in the water system to be treated by practicing the Chattoraj invention as recited in claim 1 of the reference. Therefore, it is respectfully pointed out that it is clear that with such a modification, the fluorogenic agent would have clearly been present in the feed stream. Moreover, it is also expected that certain fluorogenic agents would have been present in the first stream and the second stream. Even if the fluorogenic agent is too large to pass through the reverse osmosis membrane, claim 1 under examination does not require that the fluorogenic agent is present in the first stream and the second stream. Specifically, instant claim 1 recites "...providing a fluorometer to detect the fluorescent signal of the fluorogenic agent in **at least one** of the feed stream, the first stream, and the second stream" (emphasis added). Furthermore, Chattoraj et al. also indicates that commercially available fluorometers are suitable for the practice of their invention for detecting the fluorogenic agent (column 6, lines 42-45). Thus, the rejections must be maintained.

With respect to the arguments pertaining to claim 16, it is respectfully noted that the claim does not recite the limitations listed in the last paragraph of page 11 of the response filed on October 19, 2005.

Finally, the applicant presented arguments for traversing rejections of claims 1-20 which applicant indicates in the previous office action had been rejected under 35 U.S.C. 103(a) as being unpatentable over Chattoraj et al. in view of Ridgway and further in view of Zeiher or

Hoots. However, it is respectfully pointed out that the claims had not been rejected over the combination of these references in the previous office action.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-5 and 9-17 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 6,329,165 B1 (Chattoraj et al., document AG of the present IDS) in view of Ridgway et al., 1996 (document

AP of the present IDS). Although conflicting claims are not identical, they are not patentably distinct from each other. Claims 1-5 and 9-17 of the instant application are directed to a method of monitoring biofouling in a membrane separation system comprising the steps of: a) adding a fluorogenic agent into the system; b) allowing the fluorogenic agent to react with microorganisms (e.g. planktonic microorganisms and sessile microorganisms) in the system to form a reacted fluorogenic agent; c) providing a fluorometer to measure fluorescence; d) measuring the fluorescent signals of the fluorogenic agent and the reacted fluorogenic agent; e) monitoring biofouling in the system by determining a ratio of the fluorescent signal of the reacted fluorogenic agent to the unreacted fluorogenic agent; and f) determining the rate of change of the fluorescence ratio. The method of the instant application is limited to membrane systems such as cross-flow or dead-end flow membrane systems, examples include reverse osmosis, nanofiltration, ultrafiltration, microfiltration, inter alia. Fluorogenic agents usable in the claimed method include resazurin, 4-methylumbelliferyl phosphate, pyranine phosphate, and others. The method also comprises steps for controlling biofouling by way of biocontrol treatments such as the use of biocides, biocontrol agents or biocontrol methods. Additionally, an inert fluorescent tracer can be included.

Chattoraj et al. (in claims 1-15) discloses a method for monitoring planktonic and sessile microbiological populations (i.e. biofouling) in an industrial water system comprising the steps of: a) adding a fluorogenic agent into the system; b) allowing the fluorogenic agent to react with any planktonic microorganisms and sessile microorganisms in the system to form a reacted fluorogenic agent; c) providing a means for measuring fluorescence (i.e. a fluorometer); d) measuring the fluorescent signals of the fluorogenic agent and the reacted fluorogenic agent and

calculating the ratio of the signals; e) monitoring biofouling in the system by determining a ratio of the fluorescent signal of the reacted fluorogenic agent to the unreacted fluorogenic agent; f) determining the rate of change of the fluorescence ratio; g) determining the optimal amount of biocide to add to the system based on the ratio or rate of ratio change; and h) delivering the optimal amount of biocide into the system. Fluorogenic dyes usable include resazurin, 4-methylumbelliferyl phosphate, and pyranine phosphate. Additionally, an inert fluorescent tracer can be included. Chattoraj et al. does not expressly disclose that: 1) the method is usable on membrane separation systems such as those claimed in the instant application, and 2) biocontrol agents or biocontrol methods can be used to control biofouling (Chattoraj et al. only teach the use of oxidizing and non-oxidizing biocides). However, Ridgway et al. teaches that membrane separation processes such as reverse osmosis, microfiltration, nanofiltration and ultrafiltration, play essential roles in modern water treatment practice (page 6.1, lines 1-3). Additionally, membrane biofouling is a widespread problem in these treatment processes, especially in feedwater and **industrial** processes such as ground-**water treatment**, seawater desalination, and **water production** (i.e. in industrial water systems). See section 6.5 "Occurrence of membrane biofouling" on pages 6.20-6.21. Ridgway et al. also teaches that various options are available to control biofouling. Examples include the use of biocides, biocontrol agents (such as chelating agents, surfactants, and chaotropic agents), and biocontrol methods (such as ultrasound, electric fields, and air backwashes). See Table 6.4 on page 6.43.

Therefore, since membrane separation systems are commonly used in industrial water systems, as taught by Ridgway et al., it would have been obvious to use the method of Chattoraj et al. and apply it to membrane separation systems. Although Chattoraj et al. only disclose the

use of biocides as a means to control biofouling, it would have been obvious to modify that aspect of the method to include the use of other biocontrol agents and methods since these other venues are also known and practiced in the art, as disclosed by Ridgway et al., supra.

Applicant's arguments have been fully considered but they are not persuasive. It is respectfully noted that the claims 1-5 and 9-17, and not claims 1-5, 7-14, and 16-20 as stated in the response filed October 19, 2005, had been rejected as being obvious over Chattoraj et al. in view of Ridgway et al. Applicant asserts that the cited references do not teach or suggest the use of fluorometers to detect fluorescence in the feed stream, first stream, and second stream. As indicated above, it would have been obvious to have modified the Chattoraj invention by including a reverse osmosis membrane separation system in the water system to be treated by practicing the Chattoraj invention as recited in claim 1 of the reference. Therefore, it is respectfully pointed out that it is clear that with such a modification, the fluorogenic agent would have clearly been present in the feed stream. Moreover, it is also expected that certain fluorogenic agents would have been present in the first stream and the second stream. Even if the fluorogenic agent is too large to pass through the reverse osmosis membrane, claim 1 under examination does not require that the fluorogenic agent is present in the first stream and the second stream. Specifically, instant claim 1 recites "...providing a fluorometer to detect the fluorescent signal of the fluorogenic agent in **at least one** of the feed stream, the first stream, and the second stream" (emphasis added). Furthermore, Chattoraj et al. also indicates that commercially available fluorometers are suitable for the practice of their invention for detecting the fluorogenic agent (column 6, lines 42-45). Thus, the rejections must be maintained.

With respect to the arguments pertaining to claim 16, it is respectfully noted that the claim does not recite the limitations listed in the second paragraph of page 16 of the response filed on October 19, 2005.

Claims 1-17 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-19 of U.S. Patent No. 6,699,684. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant application reads on a membrane separation method which is recited in `684 claims 3 and 4. Therefore, the claims under examination are properly considered obvious over the patented claims. Note that no terminal disclaimer had been filed, thus the rejections must be maintained.

Claims 1-17 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-13, 16, 18-20 of copending Application No. 10/740336. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant application reads on a membrane separation method which is recited in `336 claim 3. Furthermore, while `336 includes steps for the selection of a fluorogenic agent and an inert tracer, these selection steps would have been considered a matter of routine experimentation, as it would have been obvious to determine appropriate fluorogenic agents and tracers in order to optimize the monitoring of biofouling.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Therefore, the claims under examination are properly considered obvious over the `336 claims.

Note that no terminal disclaimer had been filed to obviate the rejections. Thus, the rejections must be maintained.

No claims are allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Susan E. Fernandez whose telephone number is (571) 272-3444. The examiner can normally be reached on Mon-Fri 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Wityshyn can be reached on (571) 272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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sef

FRANCISCO PRATS
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